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THE PSYCHOLOGY OF ARCHITECTURE

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ABSTRACT

With the rising percentage of mental health cases in urban areas, it is important to look into the factors that contribute to this crisis. The correlation between architecture and psychology is unmistakable and it is essential that we make use of these findings to better city design. Humanity's inherent biophilia along with our preference for curved lines can prove to be helpful evidence. All the empirical data compiled in this paper points towards the importance of green spaces, triangulation, and the removal of monotony in urban design. The findings display strong correlations between architecture and humans' mental state and how various pieces of evidence can help us to enhance the way we plan and design our cities.

KEYWORDS: Architecture, biophilia, psychology, green spaces, urban design, fractals

INTRODUCTION

According to the World Bank, approximately 56% of the world's population lives in cities and the trend is expected to continue, with 7 out of 10 people living in urban centres by the year 2050. It is evident that the world is going through a process of rapid urbanisation. If we look past the many advantages of living in crowded metropolises, there are some underlying issues with city life: a "meta-analysis by Reddy and Chandrashekhar (1998) revealed higher prevalence of mental disorders in urban area(s) i.e., 80.6%, whereas it was 48.9% in rural area(s)." (Srivastava, 2009). Undoubtedly, a lot of human experiences and emotions are shaped by the built space around them. The phenomena of plummeting mental health grades in urban areas can be linked to architecture. Architecture refers to a built environment, while psychology may refer to how a human perceives and reacts to the physical environment around him. If personal preferences and tastes are foregone, many aspects of architecture may be proved to have a definite effect on a person's psychological state (oftentimes due to evolutionary bias) - the prevalence of different shapes, colours, and the presence or absence of natural features in the built environment around one can have non-trivial positive or negative consequences when it comes to the state of mind. The effects of architecture on psychology are significant and can shape the way we experience our surroundings. This paper discusses the various biases that humans hold for certain design elements (i.e. curved or angular shapes, patterns and geometry, green spaces, etc.) and how this knowledge can be used to expand upon the improvement of urban design to make our cities "happier".

Literature Review

"Architectural Lessons from Environmental Psychology: The Case of Biophilic Architecture" by Yannick Joye (2007) exposes us to the biophilia of humans and Ulrich's findings in relation to environmental psychology. The most important argument the source lends is about fractal geometry. *"Disrupting monotony during social isolation stress prevents early development of anxiety and depression-like traits in male rats"* by Saroj Kumar Das et al. (2015) states findings on how a monotonous environment takes a toll on the mental health of the subjects (i.e., male rats). This connects us to how monotonous surroundings lead to the deterioration of mental state. *"Urban Design and Mental Health"* by McCay Layla et al. (2017) discusses the role of green spaces in improving our perception of our surroundings and proposes solutions made in previous findings for how to reduce boredom in a city walker. *"Exposure to high-rise buildings negatively influences affect: evidence from the real world and 360-degree video"* by Robin Mazumder et al. (2020) talks about how high-rise buildings (a common feature of modern cities) lead to feelings of oppressiveness or unhappiness. This furthers our discussion about the drawbacks of urban design. *"The Social Life of Small Urban Spaces"* by William H. Whyte identifies problems with modern city life and proposes the concept of triangulation to urge more social interaction in cities (through design intervention).

Architecture & Psychology

Roman architect Vitruvius argued that a building with good design should align with the proportions and reflect the form of the human body (Fig. 1.1) (Monfries, 2020). 'De Architectura' was the book penned by Vitruvius that became the indispensable handbook for Roman architecture during the *Renaissance* era. The *Renaissance* was a movement that helped society move out of the Dark Ages and move towards the increased significance of the 'human' or 'man' in depictions of art. It was essentially Vitruvius that laid the foundations of the connections between architecture and human psychology.

In relatively recent times, the work of Robert Ulrich has provided an impetus to this scholarly discussion. *Supportive Design Theory* was developed by him to demonstrate how spaces may be designed in a way that reduces stress. The main pointers were the sense of control, social support, and positive distractions in the physical environment (Ulrich, 1991).

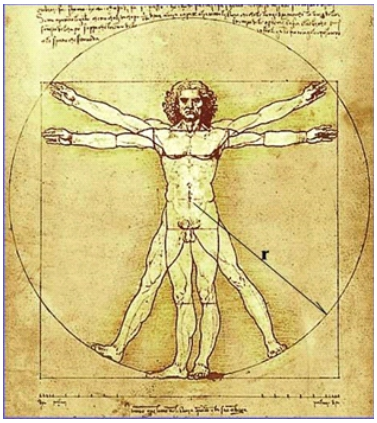


Fig. 1.1: Vitruvius's Visualization of Man and his Proportions

Biophilia in Humans

It is to be stressed that natural elements and green spaces play an integral role in making today's architecture more 'friendly'. Humans are attracted to natural elements and their psychological state is non-trivially affected by their presence or absence. Natural elements are thought to contribute to the restoration of a human's state of mind from a state of stress. Ulrich (1993) has shown that such restorative responses occur usually in low-threat (savannah-like) settings. In a 1984 study, Ulrich "discusses a study of hospital patients who had undergone gall bladder surgery and had rooms with views of either a small tree group or of a brown brick wall. As opposed to patients with the brick wall view, patients with the tree view had shorter hospital stays and fewer postoperative complications" (Joye, 2007). A major implication of this biophilia in modern architecture may be the incorporation of more green spaces, imitation of natural elements, and integration of nature's fractal geometry in design.

Urban Design & its Drawbacks

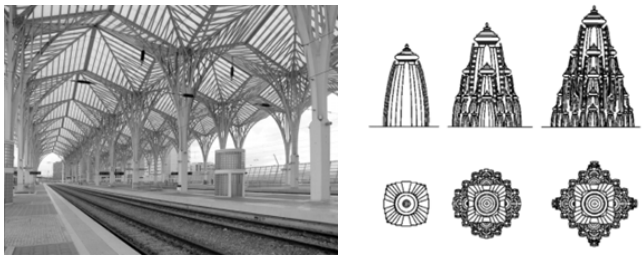
Due to the exponentially rising population, the focus of urban planning shifts from welfare to the sole purpose of housing as many people as possible. At the same time, design in cities insinuates feelings of isolation and depression in the residents. An important causative agent is thought to be the dwindling green spaces in urban areas. Urban design also shifts further and further away from architecture that resembles naturalistic elements: sharp lines and cut corners dominate design in urban areas. A common sight in today's cities is high-rise buildings. However, it has been suggested that they create a threatening atmosphere that may lead to behavioural freezing. High-rise buildings have been

thought to elicit feelings of oppressiveness (Mazumder, 2020). Mazumder's findings initiate a conversation on the design of our cities. This raises the question: Is it right if structures such as high-rise buildings that dominate the cityscape instigate negative emotions or reactions? Along with the isolating feelings brought upon due to urban design, monotony is a concern. Endless stretches of grey brick walls and similar-looking buildings provide little excitation to the mental state. It is suggested "that monotonous environment independently contributes to impairment in mood state" (Kumar Das, 2015). A somewhat overlooked problem that also arises is the use of jagged and sharp lines in modern architecture albeit it has been proven that humans prefer softer, curved lines. Following the hypothesis of biophilia, curved lines are preferred as they are more in consonance with natural elements and hence seem more harmonious or relaxing (Puerto, 2016).

How do we improve city design?

I. Fractal Geometry

As emphasized in the above section, imitation of natural elements or their geometry is one of the most essential steps to be taken to enhance the design. One may believe that direct imitation of nature is the way to supplement the restoration of mental state however use of nature's inherent fractal geometry in design may be a more practical approach (Joye, 2007). Fractals can be thought of as never-ending patterns. Fractal geometry deals with the geometry of hierarchies and random processes. Fractal geometry serves as the design mechanism in biological organisms (Weibel, 1991). Excellent examples of fractal geometry in architecture are given in Figures 4.1 and 4.2.



Figures 4.1, 4.2: Examples of Fractal Geometry - "Forest of Trees" at Orient Station, and Hindu temples displaying fractal geometry

II. Green Spaces

Apart from the use of nature's geometry, the actual use of nature in design is also an essential heading. According to a study by Negami (2018), "Spaces with greenery and spaces with a colorful, community-driven urban intervention were associated with higher levels of happiness, trust, stewardship and attraction to the sites than their more standard comparison sites". "The effects of green spaces include the positive impact on stress reduction, improved social and cognitive functioning and reductions in depression" (Layla, 2017). Many studies point towards the importance of design interventions in the form of green spaces.

III. Introduction of variety and triangulation in city planning and design

Another aspect of design intervention is the removal of monotony. Urban planners should work on making cities more interactive and exciting, and escape the blueprint of grey walls and high-rise buildings that all seem to look the same. "Urbanists such as Jan Gehl (2011) recommend that to engage people's minds and prevent rumination and boredom, the average walker, moving at a rate of about 5 km per hour, should see an interesting new site about once every 5 s" (Layla, 2017). It is also suggested that monotony can worsen mood disorders like depression (Das, 2015). While we are on the subject of loneliness and depression, something to be noted is characteristics of urban areas are especially isolating. A solution to this would be triangulation: "that process by which some external stimulus provides a linkage between people and prompts strangers to talk to each other" (Whyte, 1980). Design must incorporate elements that stimulate interaction in a way that isolation in modern cities is minimised.

Conclusion

There are many faults in modern architecture that the human community fails to look through. Fractal geometry, green spaces, triangulation, and removal of monotony are ways we can enhance the average city-dwellers experience in an urban setting. It is to be kept in mind that most of the proof to be found on the subject is in the form of empirical data and accurate neuroscientific analysis of the brain when exposed to different architecture is hard to conduct because MRIs or other scanning mechanisms cannot be made mobile. This is a field still in need of extensive research but is one that can exponentially increase levels of happiness in modern-day cities. It is also important to note, that aside from design interventions to help mental state, sustainability must be our main priority. Green spaces are one of the most powerful tools we can use. Architecture and psychology have significant correlations and it is imperative that we incorporate these into practical design.

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